

**REMARKS**

This is a full and timely response to the outstanding non-final Office Action mailed June 21, 2005. Claims 1, 3, 5 – 10, and 17 – 20 remain pending. Reconsideration and allowance of the application and presently pending claims are respectfully requested. In addition, Applicant does not intend to make any admissions regarding any other statements in the Office Action that are not explicitly referenced in this response.

**I. Allowable Subject Matter**

The Office Action indicates that claims 1, 3, and 5 – 10 are allowed. Applicant greatly appreciates the Examiner's indication of allowance.

**II. Rejections Under 35 U.S.C. §103**

The Office tentatively rejected claims 17-20 under 35 U.S.C. § 103(a) as allegedly unpatentable over the combination of Chen (cited in previous Office Action) in view U.S. Patent 6,157,680 to Betts. In order for a claim to be properly rejected under 35 U.S.C. §103, the teachings of the prior art reference must suggest all features of the claimed invention to one of ordinary skill in the art. *See, e.g., In re Dow Chemical*, 837 F.2d 469, 5 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1988); *In re Keller*, 642 F.2d 413, 208 U.S.P.Q. 871, 881 (C.C.P.A. 1981). Further, "[t]he PTO has the burden under section 103 to establish a prima facie case of obviousness. It can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references." *In re Fine, Minnesota Mining and Mfg. Co. v. Chemque, Inc.*, 303 F.3d 1294, 1299 (Fed. Cir. 2002).

A. Claims 17 – 20 are Patentable Over *Chen* in view of *Betts*

1. Claim 17 is Patentable Over *Chen* in View of *Betts*

The Office Action tentatively rejected claim 17 under 35 U.S.C. 103(a) as allegedly unpatentable over U.S. patent number 6,256,383 to *Chen* (“*Chen*”) in view of U.S. patent no. 6,157,680 to *Betts* (“*Betts*”). Applicants respectfully traverse this rejection for at least the reason that *Chen* in view of *Betts* fails to disclose, teach, or suggest all of the elements of claim 17.

More specifically, claim 17 recites that:

17. A digital signal transceiver, comprising:
- a transmitter configured *to receive a locally generated transmit signal*;
  - a hybrid electrically coupled to the transmitter configured to receive and inductively couple the transmit signal to a two-wire transmission line, *the hybrid further configured to receive a remotely generated receive signal along the two-wire transmission line*;
  - a receiver configured to process the remotely generated receive signal; and
  - an echo canceller *disposed in parallel between the transmitter and the receiver* configured to reduce both *short-term echo components* and long-tail echo components of the locally generated transmit signal *wherein the echo canceller calculates coefficient values for less than N taps while emulating a N tap digital filter*.

(*Emphasis added*).

First, the Office Action first alleges that *Chen* teaches a “hybrid electrically coupled to the transmitter configured to receive and inductively couple the transmit signal to a two-wire transmission line, the hybrid further configured to receive a remotely generated receive signal along the two-wire transmission line” (OA p. 3, lines 10 – 13). However, as stated in *Chen* column 5, lines 23 – 26, “[t]he 2 to 4-wire hybrid converter 24 not only passes the signal received *from the distant party via the 4-wire line to the local party via the subscriber 2-wire line*, but

also acts as an echo path.” As illustrated in this passage, 2 to 4 hybrid converter 24 does not receive and inductively couple the transmit signal *to a two-wire transmission line*, as the Office Action alleges. For at least this reason claim 17 is patentable over *Chen*, in view of *Pfeil*.

Secondly, the Office Action states that *Chen* teaches an “echo canceller... configured to reduce *both* short-term echo components and long-tail echo components of the locally generated transmit signal” (OA, p. 3, lines 16 – 18). However, nowhere in *Chen* is there any discussion of this result. As stated in *Chen*’s title “IIR Filter of Adaptive Balance Circuit for Long Tail Echo Cancellation,” there is no mention of reducing short-term echo components. For at least this reason, claim 17 is patentable over *Chen* in view of *Pfeil*.

Thirdly, the previous Office Action admitted that “Chen fails to clearly teach the echo canceller calculates coefficient values for less than N taps while emulating an N tap digital filter.” Inconsistent with this previous admission, the present Office Action, alleges that this claimed feature is effectively taught in *Chen* in col. 3, lines 10-43. Applicants disagree.

Specifically, the present Office Action states

... it is obvious that the FIR filter is reducing the short term echo and the IIR filter is reducing the long-tail echo for using dual filter in echo canceller system), wherein the echo canceller calculates coefficient values for less than N taps while emulating an N tap digital filter (see col. 3, lines 10-43).

In contrast to this allegation by the Office Action, the cited portion of *Chen* actually states:

In a preferred embodiment of an automatic balance system, the FIR filter system includes one or more FIR taps for replicating a leading portion of an echo signal, whereas the non-adaptive IIR filter system provides for replication of a remaining or tail portion of the echo signal. Such a system is particularly useful when echo signal characteristically exhibits a generally smooth, monotonically decaying tail, herein referred to as a long-tail echo.

According to one specific aspect of the present invention, an automatic balance system for a wireless local loop communication system, comprising filter circuitry for producing an inverted replica of an echo signal in the transmit signal, the filter circuitry including: one or more finite impulse response (FIR)

taps for replicating a leading portion of the echo signal, and a non-adaptive infinite impulse response (IIR) filter for replicating a tail portion of the echo signal and the associated adaptation control circuitry.

In accordance with another embodiment of the present invention, the aforementioned aspect of the present invention is used in combination with a wireless local loop communication system, the system including a hybrid conversion system to which the transmit signal is sent and from which the echo signal is reflected.

Another aspect of the present invention provides for a method for canceling an echo signal from a transmit signal in a wireless local loop communication system, including the steps of: using one or more finite impulse response (FIR) taps to replicate a leading portion of the echo signal, using a non-adaptive infinite impulse response (IIR) filter arrangement to replicate a tail portion of the echo signal, and inverting and combining the replicas of the leading and trailing portions with the echo signal in the transmit signal, thereby substantially to cancel the echo signal.

As can be readily verified from even a cursory reading of the above-quoted portion of Chen, there is no teaching of the claimed "wherein the echo canceller calculates coefficient values for less than N taps while emulating a N tap digital filter."

For at least these reasons, the rejection of claim 17 is misplaced and should be withdrawn.

In addition, the Office Action admits that "Chen fails to teach the hybrid included the transformer for inductively couple to the transmit signal. However, Betts teaches such feature (see figure 4, hybrid transformer 136)." In combining Betts with Chen, the Office Action has failed to identify a proper suggestion or motivation to combine the selective teachings of *Chen* and *Betts*. In this regard, it is well-settled law that in order to properly support an obviousness rejection under 35 U.S.C. § 103, there must have been some teaching in the prior art to suggest to one skilled in the art that the claimed invention would have been obvious. W. L. Gore &

Associates, Inc. v. Garlock Thomas, Inc., 721 F.2d 1540, 1551 (Fed. Cir. 1983). More significantly,

The consistent criteria for determination of obviousness is whether the prior art would have suggested to one of ordinary skill in the art that this [invention] should be carried out and would have a reasonable likelihood of success, viewed in light of the prior art. ..." Both the suggestion and the expectation of success must be founded in the prior art, not in the applicant's disclosure... In determining whether such a suggestion can fairly be gleaned from the prior art, the full field of the invention must be considered; for the person of ordinary skill in the art is charged with knowledge of the entire body of technological literature, including that which might lead away from the claimed invention.

(Emphasis added) In re Dow Chemical Company, 837 F.2d 469, 473 (Fed. Cir. 1988).

In this regard, Applicant notes that there must not only be a suggestion to combine the functional or operational aspects of the combined references, but that the Federal Circuit also requires the prior art to suggest both the combination of elements and the structure resulting from the combination. Stiftung v. Renishaw PLC, 945 Fed.2d 1173 (Fed. Cir. 1991). Therefore, in order to sustain an obviousness rejection based upon a combination of any two or more prior art references, the prior art must properly suggest the desirability of combining the particular elements to realize an electronic device with an illumination circuit, as claimed by the Applicant. When an obviousness determination is based on multiple prior art references, there must be a showing of some "teaching, suggestion, or reason" to combine the references. Gambro Lundia AB v. Baxter Healthcare Corp., 110 F.3d 1573, 1579, 42 USPQ2d 1378, 1383 (Fed. Cir. 1997) (also noting that the "absence of such a suggestion to combine is dispositive in an obviousness determination").

Evidence of a suggestion, teaching, or motivation to combine prior art references may flow, inter alia, from the references themselves, the knowledge of one of ordinary skill in the art, or from the nature of the problem to be solved. See In re Dembiczak, 175 F.3d 994, 1000, 50

USPQ2d 1614, 1617 (Fed. Cir. 1999). Although a reference need not expressly teach that the disclosure contained therein should be combined with another, the showing of combinability, in whatever form, must nevertheless be "clear and particular." Dembiczak, 175 F.3d at 999, 50 USPQ2d at 1617.

If there was no motivation or suggestion to combine selective teachings from multiple prior art references, one of ordinary skill in the art would not have viewed the present invention as obvious. See In re Dance, 160 F.3d 1339, 1343, 48 USPQ2d 1635, 1637 (Fed. Cir. 1998); Gambro Lundia AB, 110 F.3d at 1579, 42 USPQ2d at 1383 ("The absence of such a suggestion to combine is dispositive in an obviousness determination.").

Significantly, where there is no apparent disadvantage present in a particular prior art reference, then generally there can be no motivation to combine the teaching of another reference with the particular prior art reference. Winner Int'l Royalty Corp. v. Wang, No 98-1553 (Fed. Cir. January 27, 2000). Well-established Federal Circuit case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references. In re Dembiczak, 175 F.3d 994, 999 (Fed. Cir. 1999). Evidence of teaching or suggestion is "essential" to avoid hindsight. In re Fine, 837 F.2d 1071, 1075 (Fed. Cir. 1988). A description of the particular "teaching or suggestion or motivation [to combine]" is an "essential evidentiary component of an obviousness holding." C.R. Bard, Inc. v. M3 Sys., Inc., 157 F.3d 1340, 1352 (Fed. Cir. 1998). Indeed, in forming an obviousness type rejection, "the [Examiner] must identify specifically ... the reasons one of ordinary skill in the art would have been motivated to select the references and combine them." In re Rouffet, 149 F.3d 1350, 1359 (Fed. Cir. 1998). The Examiner can satisfy this burden of establishing obviousness in light of

combination "only by showing some objective teaching [leading to the combination]." *In re Fritch*, 972 F.2d 1260, 1265 (Fed.Cir.1992).

In combining *Betts* with *Chen*, the Office Action merely concluded that it would have been obvious "in order to connect remote device to central office." (Office Action, p. 4). This basis is clearly improper, as such a conclusory, result-oriented basis could be used to reject virtually any patent claim on an improvement system that results in a device or method that is realizes some perceptible improvement over the prior art. Improvements of this sort are the very basis that underscores the purpose of the patent system (e.g., the improvement of technology), and the rejection embodies clear (and improper) hindsight reasoning.

Simply stated, the Office Action has failed to comply with these legal standards. Consequently, the rejections of the claims are legally improper and must be withdrawn.

For at least the foregoing reasons, the rejection of claim 17 should be withdrawn. As claims 18-20 depend from claim 17, the rejections of these claims should be withdrawn for at least the same reasons.

In addition, these claims define features that are not disclosed or suggested in the cited art of record. For example, with regard to dependent claim 19, the Office Action cites col. 7, lines 3-50 as allegedly teaching the claimed feature of "wherein the digital filter adaptively calculates a tap coefficient value for a first tap of the second stage and every  $K^{\text{th}}$  tap thereafter." Applicants respectfully disagree. In this regard, Applicant see absolutely no reference in *Chen* to the adaptation scheme that is claimed. Instead, this portion of *Chen* (col. 7 ln. 3-50) describes the basic structure of their FIR block and LMS adaptation mechanism using the sign algorithm. *Chen* also states the equations used to build the echo path response, which includes an IIR component. In contrast, claim 19 defines the calculation of a first tap of

the second stage and then every Kth tap thereafter. For at least this additional reason, the rejection of claim 19 should be withdrawn.

Likewise, with regard to dependent claim 20, the Office Action cites col. 2, lines 28-35 and col. 7, lines 3-50 as allegedly teaching this feature. Applicants disagree. Claim 20 further defines the transceiver of claim 19 "wherein the digital filter interpolates the calculated tap coefficient values for the second stage to identify coefficient values to apply at taps disposed between taps associated with a calculated tap coefficient." The cited portions of Chen do not teach any interpolation between taps. For at least this additional reason, the rejection of claim 20 should be withdrawn.

### **III. Cited Art Made of Record**

The cited art made of record has been considered, but is not believed to affect the patentability of the presently pending claims.

### **CONCLUSION**

In light of the foregoing amendments and for at least the reasons set forth above, Applicants respectfully submit that all objections and/or rejections have been traversed, rendered moot, and/or accommodated, and that the now pending claims 1, 3, 5 - 10, and 17 - 20 are in condition for allowance. Favorable reconsideration and allowance of the present application and all pending claims are hereby courteously requested.



If, in the opinion of the Examiner, a telephonic conference would expedite the examination of this matter, the Examiner is invited to call the undersigned agent at (770) 933-9500.

Respectfully submitted,



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